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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/325,534	06/03/1999	CHARLES J. NAEGELI	CISCP085/799	2932

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EXAMINER
KUMAR, PANKAJ

ART UNIT	PAPER NUMBER
2631	

DATE MAILED: 08/22/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/325,534	NAEGELI ET AL.	
	Examiner	Art Unit	
	Pankaj Kumar	2631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-32 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-32 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 6/26/2002 have been fully considered but they are not persuasive.

1. Baran teaches assigning a first time slot to the cable modem in which the cable modem can transmit data upstream (fig 3a 80 in Baran). Baran teaches reserving a second time slot (fig 3a 81 in Baran), unassigned to a particular cable modem. Applicant argued that the buffers 80 and 81 do not reserve a time slot to a cable modem. Buffers 80 and 81 reserve a time slot to a cable modem since at certain points in time, Baran's system would request data to transmitted and received to and from the cable modem 108. At such times, Baran's buffers 80 and 81 will be filled with data. For the buffers to be filled with data, it is inherent for time slots to be reserved during which time the buffers will be filled with data.

2. In response to applicant's argument that Overbury is for continuous time while applicant's claims deal with time slots (and Baran also deals with time slots as explained above and in the first office action), the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

3. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on

combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Response to Amendment

4. Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

6. A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Baran 5926479 in view of Overbury 5832032.

8. Regarding claim 1, Baran shows a method of detecting upstream (abstract: upstream is towards transmission interface unit while downstream is towards terminal units) signal transmission quality of a cable modem, the method comprising:

9. assigning a first time slot to the cable modem in which the cable modem can transmit data upstream (fig 3a 80 in Baran);

10. reserving a second time slot (fig 3a 81 in Baran), unassigned to a particular cable modem;

11. informing a FFT generator of the first time slot and of the second time slot (fig 3a Baran, microcontroller via 74 bus controls the buffers)

12. What Baran states in the last full paragraph of column 12, is that ffts are used which indicates generating one or more FFT measurements of an upstream spectrum during the first time slot and the second time slot. What Baran does not show is the comparing of FFT

measurements of the first time slot with FFT measurements of the second time slot thereby detecting undesirable noise created by the cable modem. What Overbury shows, while interfacing communication systems in figure 10, is that two different FFTs are taken (104 and 107 and there are compared in 109. It would have been obvious to one skilled in the art at the time of the invention to modify Baran with Overbury's 2 FFT comparison by adding comparison block after FFTing the buffers 80 and 81. One would be motivated to do so for a better system.

13. Regarding claim 2, claim 1 is described above. Since the receiver received data, it is inherent for the receiver to know that there was an originator in a time slot. Since the receiver then sends data, it is inherent for it to assume that there is a time slot accepting data. Thus it is inherent for the upstream receiver to be informed of the first time slot and the second time slot.

14. Regarding claim 3, claim 1 is described above. It is inherent in Baran for the MAC unit (fig 3a Baran, microcontroller via 74 bus controls the buffers) to assign the first time slot for transmitting and reserving the second time slot.

15. Regarding claim 3, claim 1 is described above. Baran shows assigning the first time slot for transmitting (Baran fig. 12c shows in 578, 580, and 584 the sending of data to register B if there is data to be transmitted) and reserving the second time slot (Baran fig. 12b shows in 532, 534, and 536 the transferring of contents of register B into register A if there is data to be handled). The MAC unit (fig 3a Baran, microcontroller via 74 bus controls the buffers) is also involved.

16. Regarding claim 4, claim 1 is described above. Baran mentions upstream data and the use of FFT's. Overbury shows full FFTing in figure 10. Thus, It would have been obvious to one skilled in the art at the time of the invention to modify Baran with Overbury to have the FFT

measurements made of the entire upstream spectrum. One would be motivated to do so for a well performing system

17. Regarding claim 5, claim 1 is described above. Overbury shows FFTing (104, 107) and FFT comparison (109). The comparison looks at a set of points (e.g. graph) and the magnitude of the set of points (e.g. frequency power). Baran is for upstream communication. Thus, Overbury generating one or more FFT measurements of an upstream spectrum further includes creating one or more frequency-power spectrum graphs. It would have been obvious to one skilled in the art at the time of the invention to combine Overbury with Baran for the above reason.

18. Regarding claim 6, claim 1 is described above. Overbury in figure 10 shows comparing FFT measurements. Baran shows the first time slot (fig. 3a 80) and the second time slot (fig. 3a 81). It would have been obvious to one skilled in the art at the time of the invention to modify Baran with Overbury with FFT measurements of the second time slot further includes calculating the difference between two FFT measurements.

19. Regarding claim 7. A method as recited in claim 6 wherein calculating the difference between two FFT measurements further includes taking the difference between the power level of a first FFT point in a first FFT measurement and the power level of a corresponding FFT point in a second FFT measurement. (Overbury fig. 2 shows frequency powers and fft involves converting a signal from time to frequency domain and fig. 10 shows the comparing, 109, of the two FFTs, 105 and 108, which involves difference measurement to control the weights.)

20. Claims 8, 10-11 are discussed above.

21. Regarding claim 9. A method as recited in claim 1 further comprising incrementing a sampling counter after every second FFT measurement and using the sampling counter to determine whether more FFT measurements are needed. (Baran fig. 7 shows counters and data validity checker which may be used in combination with Overbury's ffts)

22. Regarding claim 12. A method as recited in claim 11 further comprising determining whether any of the power differences are greater than a predetermined threshold power ratio (Overbury fig. 8 shows automatic gain control (AGC)).

23. Regarding claim 13. A method as recited in claim 12 further comprising informing a MAC unit to not assign a time slot to the cable modem if any of the power differences are greater than the predetermined threshold power ratio. (Overbury fig. 9: 89 may adjust the weights in 90 based on signal and noise levels so as to effectively disable the modem)

24. Regarding claim 14. A method as recited in claim 11 wherein calculating power differences further includes calculating power differences between pairs of corresponding FFT points taken from FFT measurements of the first time slot and FFT measurements of the second time slot. (discussed above)

25. Regarding claim 15. A cable modem termination system (CMTS), the CMTS capable of detecting faulty cable modems, the CMTS comprising: an upstream receiver and demodulator capable of receiving an upstream signal; a Fast Fourier Transform (FFT) engine capable of performing FFT measurements on the upstream signal and storing the FFT measurements; and a processor for performing computations on the FFT measurements and communicating data, wherein the data relates to noise levels (fig. 2 in Overbury shows noise) of the upstream signal at predetermined times (discussed above) where in the predetermined times correspond to:

a. a time when a cable modem is transmitting data upstream (Baran fig. 12c shows in 578, 580, and 584 the sending of data to register B if there is data to be transmitted; it is inherent for this to occur at a particular time), and

b. a time when no data is being transmitted upstream (this is equivalent to reserving the second time slot (Baran fig. 12b shows in 532, 534, and 536 the transferring of contents of register B into register A if there is data to be handled)).

26. Regarding claim 16. A CMTS as recited in claim 15 further comprising: an anti-alias filter including a low-pass filter (Overbury fig. 8: LPF); and an analog/digital converter capable of converting an analog signal to a digital signal (Overbury fig. 8: ADC).

27. Regarding claims 17 and 18, both Baran and Overbury discuss various communication systems and FPGAs are commonly used in communication systems which also incorporate FFTs. Baran also discusses "programmable relay transceiver unit"

28. Regarding claim 19. A CMTS as recited in claim 15 wherein the FFT engine further comprises memory units for storing twiddle factors and intermediate data for use in an FFT measurement (inherent for any fft measurement process).

29. Regarding claim 20. A CMTS as recited in claim 15 wherein the FFT engine is located outside a headend of a cable television plant. (Overbury: fig. 3; col. 4 paragraph 1 "Interference will be picked up ... from pylon to subscriber premises" This may allow the ffting of the input signal which would allow the conversion from the time domain to the frequency domain and then multiplying this frequency domain signal with a filter to remove noise in the frequency domain.)

30. Regarding claim 21. A method of detecting a faulty cable modem in a cable television plant, the method comprising: taking a first FFT measurement of an upstream spectrum, creating a first frequency-power spectrum, at a time when a cable modem is transmitting data upstream; taking a second FTT measurement of the upstream spectrum, creating a second frequency-power spectrum, at a time when no data is being transmitted upstream; calculating a power-difference between the first FFT measurement and the second FFT measurement; and utilizing the power-difference to determine whether the cable modem is faulty (discussed above).

31. Regarding claim 22. A method as recited in claim 21 further comprising allocating a dummy time slot in which no data is transmitted upstream in the cable television plant (discussed above).

32. Regarding claim 23. A method as recited in claim 21 further comprising informing an FFT generator of the time when no data is being transmitted upstream and of the time when a cable modem is transmitting data upstream (Baran fig. 12B, 12C).

33. Regarding claim 24. A method as recited in claim 21 wherein calculating a power difference further comprises calculating the difference between corresponding FFT points in the first frequency-power spectrum and in the second frequency-power spectrum. (discussed above)

34. Regarding claim 25. A method as recited in claim 21 wherein utilizing the power-difference to determine whether the cable modem is faulty further comprises comparing the power-difference with a threshold power level (Overbury col. 6 lines 41-42 "determination of a weight W needed to cancel the interference").

35. Regarding claim 26.A method as recited in claim 25 wherein the threshold power level is 15 dB for QPSK modulation and 25 dB for QAM16 modulation. (Thresholding is discussed above. Discovering an optimum threshold value requires only routine skill in the art.)

36. Regarding claim 27. A method of detecting faulty modems in a network employing multiple channels, separated in frequency to allow modems to transmit data, the method comprising (Baran has multiple buffers in fig. 3a): for a selected modem transmitting data in a frequency channel, comparing extra-channel noise outside the frequency channel when it is transmitting data (Overbury fig. 2: noise during high end of RX signal curve) with a noise floor outside the frequency channel when the select modem is not transmitting data (Overbury fig. 2: noise during low end of RX signal curve); and if the difference between the extra-channel noise when the modem is transmitting and when the modem is not transmitting is greater than a predetermined threshold, disabling the selected modem (Overbury fig. 9: 89 may adjust the weights in 90 so as to effectively disable the modem).

37. Regarding claim 28. A method as recited in claim 27 wherein comparing the extra-channel noise is performed by comparing frequency-power spectrums at two different predetermined times known to correspond to times when the selected modem is transmitting and when the selected modem is not transmitting, respectively. (discussed above)

38. Regarding claim 29. A method as recited in claim 27 wherein the network is a cable television plant and the modems are cable modems (discussed in Baran above).

39. Regarding claim 30. A method as recited in claim 27 wherein the predetermined threshold is 15 dB for QPSK modulation and 25 dB for QAM16 modulation. (discussed above)

40. Regarding claims 31 and 32, the elements of them have been discussed above with Overbury and Baran and Baran states "software defined transceiver"

Conclusion

41. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Marchok USPN 6141317 states "FIGS. 16-22 illustrate a system that may be used, inter alia, to attain upstream and downstream symbol alignment between the head end unit and a newly added remote service unit to thereby initialize communications."

42.

43. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Pankaj Kumar whose telephone number is (703) 305-0194. The examiner can normally be reached on Monday through Thursday after 8AM to after 6:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chi H. Pham can be reached on (703) 305-4378. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9314 for regular communications and (703) 872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3800.

PK
August 14, 2002

CHI PHAM
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600 8/19/02